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STUDIES OF THE SCHWEINITZ COLLECTIONS OF FUNGI—I

SKETCH OF HIS MYCOLOGICAL WORK

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(WITH PLATES 8 AND 9)

INTRODUCTION

In view of the great importance of Schweinitz's mycological work, it seems desirable to publish certain information which the writers have accumulated and which has a direct bearing on the identification and interpretation of his species, types, and specimens.

Schweinitz's experience and training in Europe in connection with the preparation of the *Fungi of Niesky* (2) was of great value to him in his later studies of American fungi. His correspondence and exchange of specimens with Fries and Kunze were also of great assistance to him in the identification of American species. The general lack of knowledge of the microscopic characters of fungi at that period and the limitations of time and facilities naturally led to many errors in identification and imperfections in description. Notwithstanding this, Schweinitz must be regarded as the first great American mycologist. Some idea of the extent of his mycological work may be gained from the following summary:

His three published works on American fungi (11, 12, 13) contain a total of 4,491 species. Of these 1,533 were described as new and 10 new genera were established. He states in the index to his herbarium under date of July, 1828, that he had 2,800 specimens of fungi and many more were added later.

The most complete biographical sketch of Schweinitz is that by Walter R. Johnson (6), which was read before the Academy of Natural Sciences of Philadelphia, May 12, 1835, and published the same year. This paper is an appreciation rather than a

biography but contains many of the facts of Schweinitz's life and as it was compiled shortly after his death by a personal friend is the most direct source of information concerning his life and botanical work. Briefer sketches have been published by Morgan (10), Kellerman (7), Shear (14), Harshberger (5), and Lloyd (9). These are largely compiled from the memoir by Johnson and contain no new material.

Unsigned biographical sketches have been published in the Journal of the Elisha Mitchell Scientific Society for 1886 and in Popular Science Monthly for April, 1894. The former (4) appears to have been prepared by Professor J. W. Gore, at that time resident vice-president of the Society. In addition to data given by Johnson this paper contains some material obtained from Schweinitz's second son, Bishop Edmund de Schweinitz, of Bethlehem, Pa. The latter (16) is one of a series of biographies which appeared in Popular Science Monthly, most of which were anonymous and were prepared, presumably, by Dr. William J. Youmans, then editor of the Journal. This paper contains information as to Schweinitz's sons, obtained probably from his second son, Robert.

October 27, 1904, Miss E. A. Lehman presented a paper on Schweinitz (8) before the Wachovia Historical Society, of Salem, N. C. Miss Lehman has informed the writers that the material for this paper was largely furnished by Miss Adelaide Fries, a great granddaughter of Schweinitz who has made a special study of the history of the Moravians in the vicinity of Winston-Salem, N. C.

Recently, in connection with studies of the genus *Endothia*, the writers have had occasion to publish considerable information concerning Schweinitz's methods of work, together with illustrations of some of his manuscripts and specimens.

In addition to these publications the writers have had access to the Schweinitz manuscripts preserved in the library of the Philadelphia Academy of Sciences; his correspondence partly in the possession of his grandson, Dr. George de Schweinitz, of Philadelphia, and partly in the Philadelphia Academy; and many of his letters to Torrey now preserved at the New York Botanical Garden. In assembling information regarding the history

of Schweinitz's collections of fungi, the writers have been assisted by Miss Elsie M. Wakefield, of the Royal Botanic Gardens, Kew, England, Miss Alice Swayne, of Kennet Square, Pa., Mr. Wm. J. Stevenson, Jr., Dr. George de Schweinitz, and Dr. Edward J. Nolan, of Philadelphia, Dr. N. L. Britton, of New York, Mr. Eugene A. Rau, of Bethlehem, Pa., and Dr. W. G. Farlow, of Cambridge, to all of whom they wish to express their great indebtedness and appreciation.

WORK ON FUNGI

Although born in this country (Bethlehem, Pa., Feb. 13, 1780), Lewis David von Schweinitz entered the Theological Institution at Niesky (Prussia), in 1798 and it was there that his first mycological work was done.¹ In collaboration with his teacher, Professor J. B. de Albertini, he published in 1805 the *Conspectus Fungorum in Lusatie*. This book contains twelve colored plates, the work of Schweinitz.

He apparently remained at Niesky as student and teacher until 1807 when he was called to Gnadenburg, and subsequently to Gnadau as a preacher in the Moravian Church. From the latter post he came to America in 1812, having been appointed administrator of church estates in North Carolina (8). Before leaving Europe he was married by his friend Albertini, to Louisa Amelia Le Doux, a descendant of a French Huguenot family then residing in Pomerania. Napoleon's military activity made it necessary for them to come by way of Denmark and Sweden, a circumstance which resulted in Schweinitz's becoming acquainted with members of the University at Kiel in Holstein, from which institution he received in the same year the honorary degree of Doctor of Philosophy.

Arriving in this country after a voyage made eventful by the opening of the war between England and the United States Schweinitz and his bride stayed a short time in Bethlehem, Pa. It is probable that his collections in this vicinity were begun at this time, as the fifth species mentioned in his *Fungi Carolinae Superioris*, which was completed before he took up residence in

¹ Johnson (6) mentions the fact that while a young student at Nazareth, Pa. (1787-1798), he showed great interest in botany and prepared a partial flora of the region.

Bethlehem bears the following comment, "Est tantum in Pensilvania, Bethlehem." According to Miss Lehman he reached Salem, North Carolina, November 14, 1812. Here from the first he devoted much time to the study of fungi.

In his own words,²

"When I first came to Carolina I almost exclusively attached myself to the fungi and formed a considerable collection, now amounting to about 1,500 species, entirely from my neighborhood, which still keeps increasing. Of the preservable ones (Fungi) I have with few exceptions preserved specimens in my collection. The Agarici, etc., except the Pleuropodes, I excluded entirely, because, although they may be dried, they lose all their characteristics, and I try to make drawings of such as appear new, and at the beginning of the year I have commenced an augmentation in such a manner that I have 5 parallel collections as complete as I can obtain specimens in order to send to friends who wish to have them."

Schweinitz went to Europe again in 1817 (8) to attend a meeting of his denomination at Herrnhut. He took to Europe on this journey²

"My catalog of fungi, together with descriptions of all the new species by me established and specimens of them I took with me to Europe on my visit there in the year 1817-18, and left them in the care of Dr. Schwägerichen at Leipsic to make use of them at his discretion."

Schweinitz apparently returned to Salem in 1819. Miss Lehman speaks of this European visit as lasting three years, but various letters now preserved in his correspondence indicate that he was in Salem in 1819 and the volume of manuscript notes in the Philadelphia Academy of Science bears the superscription

Observations in Cryptogamiam

Salem Carolina

de med. November 1819

19 Nov.

It is evident from this that on his return to Salem Schweinitz again took up the study of the flora, especially the fungi. Shortly after his return Schweinitz welcomed a co-worker, also an officer of the Moravian Church.

"By the Rev. C. F. Denke, lately established in our vicinity, the Botanical Fraternity of North Carolina has obtained a valuable recruit and now forms a Quadro, Rev. Jacob van Vleck, C. F. Denke and myself here, and Professor Mitchell at Chapel Hill."²

² Letter to Torrey dated Salem, Stokes Co., N. C., Jan. 24, 1820.

Although carried on as an avocation in the midst of pressing church duties, his mycological work bears every evidence of care and accuracy. In the studies on which were based the manuscript taken to Europe in 1817 he certainly made use of a compound microscope of considerable power. That this microscope is the same one to which he refers in 1820 as the "great microscope"³ and which is now in the possession of his grandson, Dr. Geo. de Schweinitz of Philadelphia (see *Plates 8 and 9*), is very probable, since this instrument was manufactured by Adams of London, and is of a type very closely resembling the "Jones Improved Compound Microscope" (1) manufactured about 1798. This microscope has a set of seven simple objectives numbered 1 to 7, as well as four lenses with polished metallic rims "specula" and is in every respect one of the best instruments made at that time.

Examination and use of Schweinitz's microscope fully confirms Arthur's (3) belief that the reasons for the errors in Schweinitz's descriptions of microscopic characters are to be sought in the imperfections of his instrument. The chief causes of the mistakes were, however, not so much the manner of mounting the spores or the low magnification, as suggested by Arthur, but the lack of spherical and chromatic correction of the lenses and the poor illumination, resulting in very poor definition. An excellent illustration of the imperfections of this instrument can be obtained by examining spores of Schweinitz's *Clasterisporium caricinum* with a modern microscope and comparing the appearance with his drawings (13, *Plate XIX, Fig. 4c*), which are faithful representations of the spores as they appear under his microscope, using objectives 1 and 2.

This inevitable difference in the instruments used by mycologists of successive generations, adds emphasis to the importance of securing and preserving authentic type specimens, and to the value of such type specimens as compared with even the most careful published descriptions. It emphasizes also, as suggested by Arthur, the importance of noting very carefully the kind of microscope used and especially the desirability of preserving microscopes of every period in museums and laboratories.

³ Letter to Torrey dated June 24, 1820.

Schweinitz continued his study of the flora of North Carolina until his removal to Bethlehem, Pa., late in 1821, probably about November 20.⁴ At Bethlehem, Schweinitz came into closer touch with several American students of botany, a circumstance which he evidently greatly appreciated. In the introduction to the *Synopsis Fungorum in America Boreali* (13 p. 141) he says "Sub finem autem anni jam dicti [1821], in paterna mea domicilia Bethlehem, Northampton County, Pennsylvaniae denu[m] redux. . . .

Botanophili Americani plurimi jam mihi propinquiores, quam degenti olim apud occidentales Carolinenses, penitus toto ab orbe divisos, summa benevolentia et summo studio, quos ipsi inveniant aut quos illis aliunde missi sunt communicaverunt, prae ceteris amicissimus doctissimusque D. John Torrey, Noveboracensis Universitatis Professor."

Torrey was throughout this period Schweinitz's most frequent and valued American botanical correspondent. Torrey at times sent him fungi for identification (15, p. 8), and also loaned him books⁵ which happened to be inaccessible, among others Fries's *Systema Mycologicum*, Pt. 1. At one time Torrey and Schweinitz evidently had under consideration the publication of a joint *Cryptogamic Flora*.⁶

Schweinitz resided at Bethlehem from 1821 until his death, February 8, 1834, and here he completed, in addition to several papers on higher plants, his most important scientific work, the *Synopsis Fungorum in America Boreali* (13). During this period Schweinitz twice made journeys on church affairs. In the summer of 1831 he went to Hope, Indiana, to organize a church there. Somewhat earlier he went to Europe to attend a meeting of his denomination at Herrnhut. The date of this journey is given by Johnson and Miss Lehman as 1824, but letters to Schweinitz from Hooker and Torrey indicate that it was made in 1825.⁷

During the latter years of his life Schweinitz regularly used the prefix, de, in his signature, though he never seems to have

⁴ Letter to Torrey dated October 29, 1821.

⁵ Letter to Torrey dated Bethlehem, May 15, 1822.

⁶ Letter to Torrey dated January 16, 1825.

⁷ Under date of March 30, 1825, Torrey mentions an effort to meet Schweinitz in New York on the latter's way to Europe.

abandoned the abbreviation, L v S in his manuscripts. This change may have been due to his habitually writing his scientific papers in Latin or, as suggested by Dr. George de Schweinitz in a recent conversation, it may very probably have been done out of consideration for his wife, who, as mentioned above, was of French ancestry. His sons all retained the later form.

MYCOLOGICAL PUBLICATIONS

Following the joint paper with Albertini mentioned above, Schweinitz's next mycological publication was the *Synopsis fungorum Carolinae superioris* (10). The circumstances of its publication are given in a letter to Torrey.⁸

"I would have deferred writing longer had not the present good opportunity afforded for transmitting to you a copy of a small work bearing my name on its title page, which was sent to me from Germany—to my no small surprise, as I was utterly unaware that it would be published—although I must confess myself the author. I left it with a friend some years ago, without any such idea, but have no objection that he disposed of it that way. Possibly it will be not uninteresting to you, as it contains a list of all the fungi I had observed in N. C. previous to 1817, with definitions of the new ones, and I therefore beg of you to accept it as a token of my friendship."

The date of publication of this paper is given by Johnson as 1818 with the remark: "The date of this paper is only mentioned on personal information." The source of this "personal information" is unknown and there is no definite indication as to its authenticity. The volume, of which this paper forms a part, was published in 1822 and bears that date. Schweinitz's paper is, however, in the early part of this volume (pp. 20–132) and there is a copy of a separate in the Library of the Philadelphia Academy paged 1–105 but bearing no date. This separate was received for the Academy by Z. Collins in December, 1822.⁹ That Schweinitz himself did not receive copies of this paper until late in 1822 is shown by the letter just quoted and as he was in Europe during 1818 it is improbable that the paper could have been issued then without his knowledge.

In 1825 Schweinitz published a short paper entitled *Description of a number of new American species of Sphaeriae* (12).

⁸ Letter dated Bethlehem, November 24, 1822.

⁹ Letter from Collins to Schweinitz.

As is indicated by the introduction this is supplementary to the paper on the fungi of North Carolina.

Schweinitz's last and most important published work was the *Synopsis Fungorum in America Boreali* (13). This was published by the American Philosophical Society, Philadelphia, in the volume of Proceedings dated 1834. It was, however, actually issued as a separate two years earlier, as shown by the following note now in the possession of Dr. George de Schweinitz, of Philadelphia.

PHILAD. 29 July 1832.

M. L. D. SCHWEINITZ
Bethlehem

Sir:

By your friend the Pr. of Newid who visits us under the name of Baron de Bramsberg I have the pleasure of sending you six copies of your work making part of one [our] 4th vol. N. S. Copies will go shortly to the Different Academies and Philos Societies of Europe—to the number of about 40—We anticipate the respect with which this valuable work will be received. We have more copies at your service please inform me of the disposition of these.

I remain yours sincerely

JN VAUGHAN
Lib. of Am. Ph. Soc.

In a letter dated October 22, 1832, Torrey acknowledges the receipt of two copies, one intended for Halsey, and takes the opportunity to congratulate his friend on the "completion of this great performance." He adds this pertinent remark, "If we now had the other departments of our Acotyledones finished, we would have our entire Flora *posted up* to the present day. When shall we have our Lichens, our Musci, our Algae & our Hepaticae? Life is too short—too valuable, I ought to have said, for any *one* of us to undertake the whole."

MANUSCRIPTS

Johnson (6 p. 36–38) mentions, in addition to Schweinitz's published works, "other productions of his pen . . . some of which still remain in manuscript." Of these manuscripts a number are known to have been preserved. Mr. Eugene A. Rau informs the writers that he has several manuscripts given to him by one of Schweinitz's granddaughters, among these is Schwei-

nitz's Flora of Salem, North Carolina, which also contains marginal notes of plants that he collected in the vicinity of Bethlehem. The date of this manuscript is 1821—it is a book 8 by 13 inches with 165 pages, of which 120 pages are devoted to Phanerogams, 4 pages to Filices, 11 pages to Musci and Hepaticae, 3 pages to Fresh Water Algae, 22 pages to Lichens.¹⁰ This is evidently the unpublished portion of a flora of the vicinity of Salem, N. C., of which The Synopsis fungorum Carolinae Superioris formed a part.

Mr. Rau also has "an index to his herbarium 1822," a book which "contains a list of his correspondents with their addresses," an "Index Herbar, Europ." and a "list of Amer. Fungi in his collection."¹⁰

In the Library of the Academy of Natural Sciences, Philadelphia, are the following manuscripts dealing mostly with Fungi:

Schweinitz's Index to his herbarium marked: "Index Herbarii Ludovici Davidis de Schweinitze 1824. Adjectis plantis omnibus Zonae temperatae Graminaceis autem ac Cryptogamis totius orbis."

This is a large folio volume of several hundred pages, not numbered, containing a MS. list in Schweinitz's handwriting of the species contained in his herbarium. There is a final summary on the last page dated July, 1828, giving a list of the various orders of plants and the number of each. The grand total is 16,266 specimens, 2,800 of which are fungi."

Also a manuscript on octavo sheets with the following title:

"Description of some new American Species of the Genus *Sphaeria* being the first Genus of the Second Order *Pyrenomycetes* of the Second Class of Fungi *Gasteromycetes* according to the system of Mycology of Dr. Elias Fries supplementary to the Synopsis of Carolinian Fungi by L. De Schweinitz published in the Comentararies of the Society of Naturalists of Leipzig by Dr. Schwägerichen."

There are also three folio volumes of unpublished plates entitled "Fungorum Nieskiensis Incones" in the library. Mr. Rau states that at one time six or seven volumes of colored plates were loaned him by Schweinitz's son, Bishop Edmund de Schweinitz. Where these are is now unknown. There is now in the possession of Mrs. Lemly, a granddaughter of Schweinitz, of

¹⁰ Extracts from letter written by Mr. Rau, February 8, 1917.

Salem, N. C., a volume of unpublished plates marked Part 1 of the *Fungorum Nieskiensis*. In the Library of the Philadelphia Academy there are also numerous loose quarto colored plates of American fungi.

At the close of the life of Schweinitz published in the *Journal of the Elisha Mitchell Society* in this note: (4, p. 25)

"There is also in the possession of his son, Bishop de Schweinitz, of Bethlehem, Pa., a manuscript work entitled: '*Synopsis Fungorum Americanorum qui Ludovicus David de Schweinitz innotuere. Secundum Systema Fries.*' This work is different from No. 10 [*Synopsis Fungorum in America Boreali media degentium*] but whether written before or after is unknown. The manuscript is carefully written in three bound volumes, 8vo: the first having 116 pp., the second 175 pp., the third 100 pp. Some of the pages except the running title on the top are blank and were evidently to be filled out as the researches proceeded."

This manuscript the writers have been unable to locate.

SOURCES OF SCHWEINITZ'S HERBARIUM

On the inside of the title page of the manuscript index to his herbarium in the library of the Philadelphia Academy, Schweinitz lists seventy individuals and herbaria as "contributores." Of these the following are mentioned either in the *Synopsis fungorum in America Boreali* (13) or in the *Synopsis fungorum Carolinae Superioris* (11), as having contributed specimens of fungi; Dr. Baldwin, Zaccheaus Collins, John Le Conte, C. F. Denke, Abram Halsey, Dr. Krampman, Dr. John Torrey, and Jacob Van Vleck. European specimens of fungi were sent by Fries, Burkhardt, Kunze, and Schwaegrichen.

Undoubtedly, the greater portion of the herbarium was collected by Schweinitz himself and a very large number of the specimens come from the regions about Salem, N. C., and Bethlehem, Pa., at which places most of his life in this country was spent. Miss Lehman remarks that he collected specimens "of every plant within a radius of 30 miles from Salem," and the localities cited by him indicate that his collecting trips about Bethlehem covered an even greater area. Letters to Torrey speak of collecting trips to "The Grandfather Mountains, [N. C.] . . . chiefly for Cryptogams" and of wishing to get in connection

with Nuttall to get western Cryptogams;¹¹ also of "making a journey to Muskingum [Ohio] in July;"¹² and of a trip to Lake Erie lasting for a month.¹³

SPECIMENS OF FUNGI DISTRIBUTED BY SCHWEINITZ

From the letter to Torrey quoted above (p.—) it is apparent that Schweinitz on his visit to Europe in 1817-1818, left with Schwaegrichen specimens of all new species of fungi which he had described up to that time. Thus far it has been impossible to locate this collection although the senior author has made a careful search in the principal herbaria of Europe. The only Schweinitzian specimens known to have come from Schwaegrichen's Herbarium are a few which were found in Kunze's collection in the Herbarium of the University of Leipsic and a single specimen, which had apparently been sent to Nees von Esenbeck, in the Herbarium at Strasburg.

From the same letter it is also evident that Schweinitz began at least as early as 1820 the systematic preparation of duplicates for distribution. His method of preparing these duplicates is evident from the original packets preserved in the Philadelphia Academy of Sciences. In some cases there are two or three small packets labeled the same as the larger packet except that they bear the numbers 1, 2, 3, etc. For example "*Sphaeria Castanea* L. v. S. Beth. & Sal" is on one packet, and on a smaller packet "*Sph. Castanea* L. v. S. 3." In Kunze's herbarium at Leipsic and in the Link herbarium at Berlin, at Kew, at Upsala, and elsewhere, are autograph specimens of Schweinitz which bear these small numbers.

Throughout Schweinitz's life an active exchange of specimens was carried on between himself and Torrey.¹⁴ Later Torrey presented to Berkeley and Curtis the fungi given him by Schweinitz. Part of this collection is now in Berkeley's herbarium at Kew, and part in the Curtis herbarium at Harvard.

Schweinitz doubtless sent collections of fungi to some of his

¹¹ Letter dated Jan. 11, 1821.

¹² Letter dated May 25, 1823.

¹³ Letter dated Dec. 5, 1827.

¹⁴ Several letters from Schweinitz to Torrey.

correspondents at several different periods. Definite records of these exchanges exist in a few cases. Some time previous to 1824 Schweinitz sent to Abram Halsey, an amateur botanist of New York, a collection of fungi.¹⁵ This collection the writers have endeavored to trace but there seems to be no record of its existence. Descendants of Halsey believe it to have been destroyed by a fire in a Brooklyn Museum.

In 1824 packages of fungi were sent to Hooker¹⁶ and to Fries.¹⁷ Those sent to Hooker are preserved in the herbarium at Kew and Fries's specimens are in the herbarium at Upsala.

Schweinitz's first gift of specimens of fungi to an herbarium in this country seems to have been made in 1827 to the Academy of Natural Sciences, Philadelphia. The exact date and manner of this gift is made clear by the recent discovery in the letter files of the Academy of the following note from Z. Collins.¹⁸

"The class Pyrenomyceti of Dr. Fries in fourteen genera of North American Fungi to-wit:

Sphaeria	Phacidium
Lophium	Hysterium
Sphaeronema	Glonium
Cytisporea	Actidium
Phoma	Actinothyrium
Dothidia	Sacidium
Rhytisma	Leptostroma

In upwards of 500 species. Deficient in 150 species. From the collection of Mr. L. D. Schweinitz and by him presented to the A. N. S. through his friend Z. Collins. March 20, 1827."

Comparing the lists in Schweinitz's handwriting on the packets in the collection with the above note it is evident that they agree except that Collins omitted one genus, namely Prostemium, when he listed them. A memorandum by Schweinitz on the last folder, Number 10, says: "Summa Pyrenomycetorum 527—Desunt 153."

This collection is in ten small folio heavy paper wrappers with

¹⁵ In an undated letter to Schweinitz Halsey thanks him for the "Highly prized collection [of fungi] you have some time since sent me." Elsewhere in the letter he says, "I have just received from Hamburg, the 1st vol. of the *Bryologia Germanica* by Nees & Hornschurch, . . . just printed." The date of this publication was 1823.

¹⁶ Letter from Hooker dated July 2, 1825.

¹⁷ Letter from Fries dated April 15, 1824.

¹⁸ This note is in the file dated 1826-1840 under the letter "S."

lists of the inclosed genera and species on the outside. The species are in small paper packets bearing Schweinitz's autograph labels. These packets rarely bear the small numbers used on his regular duplicates and were evidently taken in case no number occurs from the original packet of the species. To distinguish this collection from the Schweinitz Herbarium later bequeathed to the Academy, the writers will refer to this as the "Collins collection."

Brongniart¹⁹ in a letter dated April 24, 1829, and Greville¹⁹ in a letter dated 1830, acknowledge the receipt of collections of plants from Schweinitz. Brongniart speaks specifically of Cryptogams. These were in part at least fungi, as autograph specimens of fungi from Schweinitz are found in the Brongniart herbarium at Paris and in Greville's herbarium at Edinburgh. In a letter dated 1830 Dr. Zeyher, director of the Botanic Garden at Schwetzingen, acknowledges the receipt of specimens of fungi.

In addition to the specimens listed above the senior writer has examined autograph specimens of fungi in the following herbaria: that of Kunze at Leipsic, of Jacquin at Vienna, of Link and of Ehrenberg at Berlin, and of Nees von Essenbeck at Strasbourg.

BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.

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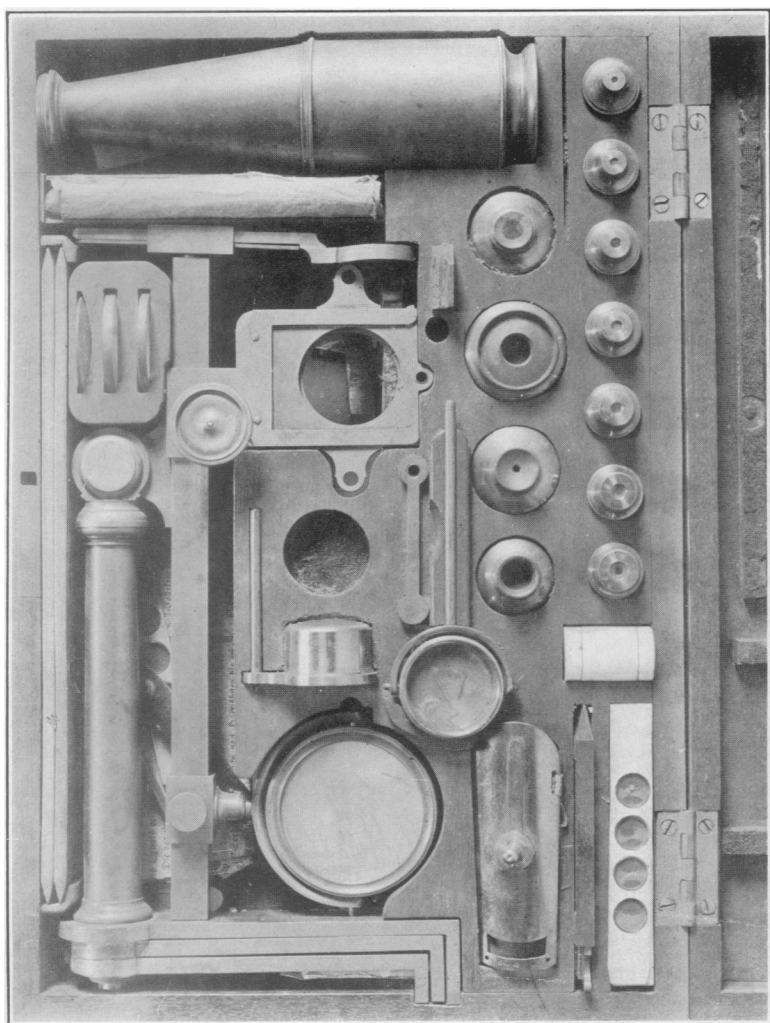
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MICROSCOPE OWNED AND USED BY SCHWEINITZ IN HIS STUDIES
OF FUNGI



SCHWEINITZ' MICROSCOPE WITH ACCESSORIES IN ITS CASE